Active Project (2014 - 2017)

Rover Technologies Project

Game Changing Development Program | Space Technology Mission Directorate (STMD)

ANTICIPATED BENEFITS

To NASA funded missions:

The rover technology developed in this project enables searching for volatiles on remote surfaces. The current target of this work is the AES Resource Prospector mission. This element is performing the technology development for the rover which will support mapping volatiles in water ice at the lunar polars.

To NASA unfunded & planned missions:

Some of the technology derived from the rover technologies element will be applicable to future human exploration rovers on remote planetary surfaces.

DETAILED DESCRIPTION

Develop and mature rover technologies supporting robotic exploration including rover design, controlling rovers over time delay and for exploring . Technology development is currently focused on Resource Prospector mission which will search for volatiles (including water) on the Lunar poles

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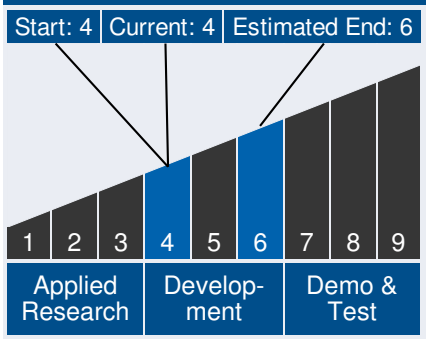
Technology Maturity



Management Team

Program Executive:

- Lanetra Tate

Program Manager:

- Mary Wusk

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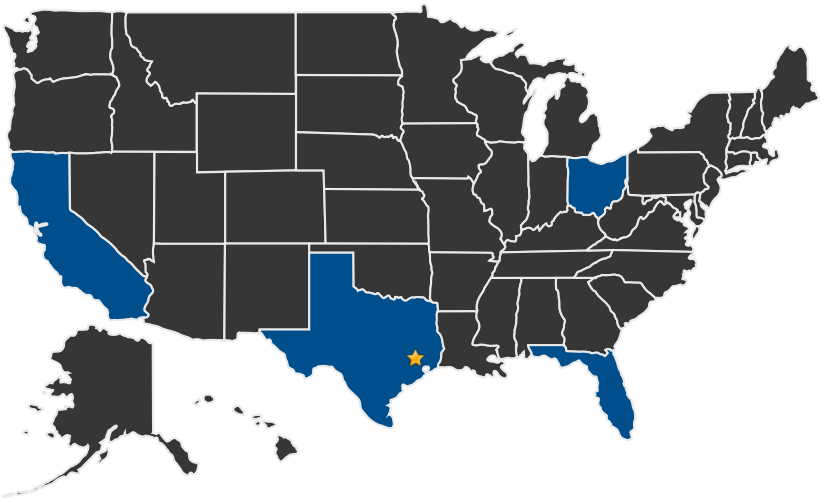
U.S. WORK LOCATIONS AND KEY PARTNERS



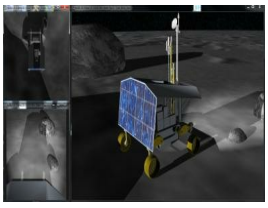
U.S. States With Work

Lead Center:
Johnson Space Center

Other Organizations Performing Work:

- Human Exploration and Operations Mission Directorate

IMAGE GALLERY



This picture shows a concept for the resource prospector surface element (rover and science payload).

Management Team *(cont.)*

Project Manager:

- William Bluethmann

Principal Investigator:

- Robert Ambrose

Technology Areas

Primary Technology Area:
Robotics and Autonomous Systems (TA 4)
└ Mobility (TA 4.2)
  └ Mobility Components (TA 4.2.8)
    └ Actuators for Mobile Robots (TA 4.2.8.2)
    └ Actuators for Mobile Robots (TA 4.2.8.2)

Secondary Technology Area:
Robotics and Autonomous Systems (TA 4)
└ Mobility (TA 4.2)
  └ Surface Mobility (TA 4.2.5)

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Technology Areas *(cont.)*

Additional Technology Areas:

- Robotics and Autonomous Systems (TA 4)
  - Manipulation (TA 4.3)
    - Manipulator Components (TA 4.3.1)
      - Motor Controllers (TA 4.3.1.3)
      - Manipulator Concepts (TA 4.3.1.4)
    - Sample Acquisition and Handling (TA 4.3.6)
      - Robotic Drilling (TA 4.3.6.1)
      - Deep Robotic Drilling (TA 4.3.6.2)
      - Surface/Shallow Robotic Sample Acquisition (TA 4.3.6.3)
      - Subsurface Robotic Sample Acquisition (TA 4.3.6.4)
      - Sample Handling (TA 4.3.6.5)
      - Regolith/Volatiles Sample Handling and Transfer (TA 4.3.6.6)
      - Robotic Excavation (TA 4.3.6.7)
    - Grappling (TA 4.3.7)
      - Grappling (TA 4.3.7.1)
  - System-Level Autonomy (TA 4.5)
    - Activity Planning, Scheduling, and Execution (TA 4.5.2)
      - Onboard Real-Time Planning and Scheduling (TA 4.5.2.1)
      - Onboard Executives (TA 4.5.2.4)
    - Automated Data Analysis

DETAILS FOR TECHNOLOGY 1

Technology Title

Prototype Rover mobility

Technology Description

This technology is categorized as a hardware system for other applications

This element will develop a lightweight prototype rover with wheeled propulsion, steering and active suspension. The active suspension will enable advanced mobilitycapabilities including managing load across the four wheels, navigating a variety of large obstacles (relative to wheel size). During FY15, the element will develop the mobility systems and integrate them into a rover system (along with a science payload).

Capabilities Provided

This technology develops capabilities to carry in-situ resource utilization resource (ISRU) science payloads for prospecting and processing searchs for volatiles. The advanced mobility systems enable traversing difficult terrain and soft soils on remote surfaces.

Potential Applications

This technology has the potential to infuse into the Resource Prospector mission. The mission will target prospecting and processing volatiles (water) on the lunar surface. Technologies developed for the project has the potential for further In-situ Resource Utiliization in the

Performance Metrics

Metric	Unit	Quantity
Active suspension travel	cm	8
Rover mass to payload mass/G	kg/kg/G	2